
APPENDIX R

HAZARDOUS MATERIALS AND WASTE

TECHNICAL MEMO

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1.1 INTRODUCTION

This technical memo supports discussions in Sections 3.16 and 4.16, *Hazardous Materials and Waste Affected Environment* and *Environmental Consequences*, respectively, of the Commonwealth of the Northern Mariana Islands Joint Military Training (CJMT) Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS). In this technical memo, a more detailed discussion is presented for the resource definition, historical use of hazardous substances, and Department of Defense programs for documenting hazardous materials associated with training activities. The historical use of munitions and hazardous waste on Tinian and Pagan is included to provide more detailed information about land uses in regard to contaminated sites on the islands in the absence of more specific data. This approach to National Environmental Policy Act (NEPA) documentation is taken to allow the layperson to read the EIS/OEIS unencumbered by information of interest to resource specialists and regulators; however, anyone can read this technical memo and be assured that the resource was thoroughly examined and that a hard look was taken to identify potential impacts.

1.2 DEFINITION OF RESOURCE

This EIS/OEIS analyzes impacts related to hazardous materials, toxic substances, hazardous waste, and contaminated sites. The potential for hazardous materials to be introduced during the course of site development and construction activities; for toxic and hazardous wastes to be generated as a result of construction and demolition activities; and for encountering contaminated media during the course of site preparation and construction/demolition activities is analyzed.

Impacts related to the continuing use of hazardous materials and generation of hazardous waste associated with aircraft/watercraft/vehicle operations and maintenance as a result of the proposed action and alternatives are also analyzed. Operational changes (increases/decreases in flying/driving time) would affect the amount of hazardous materials used and stored, as well as the amount of hazardous waste generated. In addition, changes in maintenance activities and schedules could result in a change in the use of hazardous or toxic substances or generation of hazardous wastes compared to existing conditions. Hazardous waste issues may also include the presence of specially-regulated asbestos containing materials, lead-based paint, polychlorinated biphenyls, and radon gas in structures, and exposure to contaminated sites.

1.2.1 Hazardous Materials

Hazardous materials are chemical substances that pose a substantial hazard to human health or the environment. In general, these materials pose hazards because of their quantity, concentration, physical, chemical, or infectious characteristics. When discussed in this document, hazardous materials include petroleum, oils, lubricants, cleaning agents, adhesives, paints, pesticides, and other products necessary to perform essential functions. Certain hazardous materials are frequently stored in bulk quantities (e.g., fuels, petroleum, oils, and lubricants) in aboveground or underground storage tanks and distributed with pumps and pipelines to support aircraft, watercraft, vehicle operations, and power generation. The bulk storage of petroleum, oils, and lubricants represent potential sources of leaks,

releases, or spills. Other types of hazardous materials (e.g., paints, pesticides, adhesives, cleaning agents) are frequently stored and distributed in smaller quantities such as drums, buckets, and bottles.

1.2.2 Toxic Substances

The promulgation of the Toxic Substances Control Act (40 Code of Federal Regulations [CFR] §§ 700-766) represented an effort by the federal government to address those chemical substances and mixtures for which it was recognized that the manufacture, processing, distribution, use, or disposal may present unreasonable risk of personal injury or health of the environment, and to effectively regulate these substances and mixtures in interstate commerce. The Toxic Substances Control Act Chemical Substances Inventory lists information on more than 62,000 chemicals and substances. Toxic chemical substances regulated by the U.S. Environmental Protection Agency under the Toxic Substances Control Act include asbestos and lead, which, for the purposes of this analysis, are evaluated in the most common forms found in buildings, namely asbestos-containing materials and lead-based paint. Toxic Substances Control Act also establishes management obligations for the cleanup of polychlorinated biphenyls and radon.

1.2.2.1 Asbestos

Asbestos is the name of a group of naturally occurring minerals that are used in a variety of applications. Asbestos is a fibrous mineral material that was once used in building construction as a fire and noise retardant. Asbestos-containing materials are common in many types of building and insulation materials such as cement pipes, wallboard, siding, floor tiles, mastics, plaster, coatings and paint, ceiling tiles, roofing materials, electrical insulation, caulking materials, joint compounds, boiler wrap, and duct materials. Asbestos becomes a health hazard when microscopic-sized fibers become liberated or released into the air. Inhalation of asbestos fibers is known to cause asbestosis, a chronic disease of the lungs, and mesothelioma, a cancer of chest membranes. Asbestos-containing materials have been classified as a Hazardous Air Pollutant by the U.S. Environmental Protection Agency in accordance with Section 112 of the Clean Air Act. The USEPA has established that any material containing more than 1% asbestos by weight is considered an ACM (15 USC § 2642[4]) and must be handled in accordance with the procedures outlined in 40 CFR Part 61, Subpart M. Surveys would be conducted for asbestos-containing materials (as required by 40 CFR § 61.145) during the design phase of each construction project and prior to demolition or renovation of any structure. Any located asbestos-containing materials would be characterized, managed, transported, and disposed of according to applicable federal, and Commonwealth of the Northern Mariana Islands (CNMI) requirements for protecting human health and safety and the environment.

1.2.2.2 Lead

Lead, which was added to paints for many years before 1978, has been associated with central nervous system disorders, particularly among children and other sensitive populations. Exposure to lead is usually through inhalation during renovation and demolition activities or through ingestion of paint chips or lead-contaminated drinking water. Lead-based paint may be present in buildings or other facilities that would be modified or demolished as part of the proposed action and alternatives. Similar to asbestos-containing materials, surveys would be conducted on structures to be modified or demolished for lead-based paint during the design phase of each construction project and prior to structure demolition or renovation. The federal government banned the use of lead-based paint for

household use in 1978. Lead-based paint sampling would be conducted on the structures to be removed and analyzed in accordance with U.S. Environmental Protection Agency approved Toxicity Characteristic Leaching Procedure methodology. Based on this federal testing methodology, the paint would be considered hazardous if lead is detected at concentrations greater than 5 micrograms per liter. If lead-based paint were detected at hazardous concentrations, these materials would be removed according to accepted methodologies and disposed of at a permitted facility in accordance with Resource Conservation and Recovery Act ([Section 1.3.1.2](#)) requirements. Lead-based paint would be characterized, managed, transported, and disposed of according to applicable federal, and CNMI requirements for protecting human health and safety and the environment.

Lead may also be present in expended munitions. Munitions constituents, in particular heavy metals (i.e., lead, nickel, chromium, cadmium, and copper), do not break down easily and tend to build up in surface soils. They may rust or otherwise react with natural substances, but do not break down like organic compounds. Therefore, the volume of expended material within the training areas would gradually increase over time (Department of the Navy [DoN] 2010). Low Impact Development features would be utilized to control stormwater runoff from the ranges. Range training areas would be managed in accordance with current Marine Corps range management policies and procedures, which are designed to ensure the safe, efficient, effective, and environmentally sustainable use of the ranges. To minimize potential impacts of munitions constituents accumulating and/or migrating in soil and surface water/groundwater, routine range clearance operations would be scheduled and conducted, as needed. Additional range management activities may include the use of impoundments, traps, or other structures to catch lead particles in sediments transported away from the shooting area by runoff and the application of buffering agents such as limestone, gypsum, and dolomite to maintain a more neutral pH in areas where lead may come in contact with water. These range management activities would minimize the accumulations of munitions constituents and potential impacts to the environment.

1.2.2.3 Polychlorinated Biphenyls

Polychlorinated biphenyls (PCB) are highly stable organic chemical compounds with low flammability, high heat capacity, and low electrical conductivity. Beginning in the 1920s, polychlorinated biphenyls had many common commercial, industrial, and household uses, including applications in electrical transformers and capacitors, as coolants in refrigeration machinery, and in oil and hydraulic fluids. Polychlorinated biphenyls are toxic and have been classified as a persistent organic pollutant, acting as carcinogens that do not break down easily in the environment. Thus, the manufacture and use of polychlorinated biphenyls in the U.S. was banned by Congress in 1979 and cleanup actions are regulated through the Toxic Substances Control Act. Equipment and fluids containing greater than 500 parts per million (ppm) PCBs, between 50 and 500 ppm PCBs, and less than 50 ppm PCB are considered PCB, PCB-contaminated, and non-PCB, respectively. PCB products with 0 to 49 ppm PCB are not subject to Federal regulations and can be transferred, donated, sold, or otherwise processed under CFR §101-42.1102-2. Similar to asbestos-containing materials and lead-based paint, surveys would be conducted for PCB containing equipment on structures to be modified or demolished during the design phase of each construction project and prior to structure demolition or renovation. PCB containing equipment and fluids, if present, would be managed and disposed of in accordance with applicable federal and CNMI regulations.

1.2.2.4 Radon

Radon is a naturally occurring, colorless, odorless, radioactive gas produced by the decay of uranium in rock and soil. Radon is a known carcinogen responsible for increasing the risk of lung cancer when inhaled. Electrically charged radon atoms can attach to indoor air dust particles. Subsequently, these dust particles may be inhaled and adhere to lining in the lungs. The deposited atoms decay by emitting radiation that has the potential to cause cellular damage. Typically, outside air contains very low levels of radon (U.S. Environmental Protection Agency 2013), but radon tends to accumulate in enclosed indoor spaces. When present, radon gas would typically concentrate in relatively airtight buildings that have little outside air exchange.

Although there are no federal regulations that mandate an acceptable level of radon exposure, the U.S. Environmental Protection Agency recommends the voluntary radon action level developed and issued by the American Society for Testing and Materials International, Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings, ASTM E-2121. The U.S. Environmental Protection Agency recommended action level for radon is 4 picocuries per liter (U.S. Environmental Protection Agency 2013). As a proactive measure, the Department of Defense has ongoing radon monitoring and abatement programs to ensure that its existing facilities meet the U.S. Environmental Protection Agency radon health recommendations (Agency for Toxic Substances and Disease Registry 2014). In addition, for new facilities, radon resistant construction techniques, radon testing, and the installation of radon mitigation systems as appropriate are employed.

1.2.2.5 Munitions and Explosives of Concern

Explosives in modern military ordnance are generally solid-cast explosive fills formed by melting the constituents and pouring them into steel or aluminum casings. Most new military formulations contain plastic-bonded explosives that use plastic or other polymer binders to increase their stability. Royal Demolition Explosive/High Melting Explosive blends have generally replaced trinitrotoluene in plastic-bonded formulations (DoN 2010). Munitions constituents of concern include nitroaromatics; trinitrotoluene, mainly its degradation products, and related compounds; cyclonitramines, including, Royal Demolition Explosive/High Melting Explosive; and their degradation products (trinitrotoluene degrades to dinitrotoluene) and subsequent degradation products from exposure to sunlight or bacteria (DoN 2010). Royal Demolition Explosive also is subject to breakdown by sunlight and bacteria once exposed to the environment. As a group, military-grade explosives do not dissolve easily and are relatively immobile in water (DoN 2010). The physical structure and composition of blended explosives with multiple chemical compounds, often with additional binding agents, may further slow the breakdown and dispersal of these materials (DoN 2010).

1.2.3 Hazardous Waste

The Resource Conservation and Recovery Act (42 U.S. Code 6903[5]) defines a hazardous waste as a solid waste (which can be in the form of a solid, liquid or gas), or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may: (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

For the purposes of this EIS/OEIS, hazardous waste includes solid wastes that are regulated as hazardous based on either direct listing by U.S. Environmental Protection Agency or characteristics (e.g., ignitability, reactivity, corrosivity, and/or toxicity), as well as those contaminants present in environmental media (e.g., soil or groundwater). The U.S. Environmental Protection Agency defines several hazardous waste types: (1) listed wastes (wastes that the agency has determined are hazardous); (2) characteristic wastes (e.g., corrosive, ignitable, reactive, or toxic wastes); (3) universal wastes (e.g., batteries, pesticides, mercury-containing equipment); and (4) mixed wastes (e.g., contains both radioactive and hazardous wastes).

Hazardous substances are defined and regulated under the laws administered by U.S. Occupational Safety and Health Administration, U.S. Environmental Protection Agency, and the U.S. Department of Transportation. Each of these agencies incorporates hazardous substance terminology in accordance with its unique Congressional mandate:

- U.S. Occupational Safety and Health Administration regulations categorize substances in terms of their impacts to employee and workplace health and safety;
- U.S. Department of Transportation regulations categorize substances in terms of their safety in transportation; and
- U.S. Environmental Protection Agency regulations categorize substances in terms of protection of the environment and the public health.

With regard to environmental impacts, hazardous substances are regulated under several federal programs administered by the U.S. Environmental Protection Agency, including Comprehensive Environmental Response, Compensation, and Liability Act; Emergency Planning and Community Right-to-Know Act; Toxic Substances Control Act; and the Resource Conservation and Recovery Act. Department of Defense installations are required to comply with these laws along with other applicable federal, local, and Department of Defense regulations, as well as with relevant Executive Orders.

The CNMI oversees and administers environmental regulations through the CNMI Bureau of Environmental and Coastal Quality on both Tinian and Pagan. In 1984, the CNMI adopted the U.S. federal hazardous waste regulations and amendments under the Resource Conservation and Recovery Act (Saipan Tribune 2008). The CNMI has subsequently adopted additional hazardous waste regulations that are more stringent than U.S. federal regulations.

Military munitions used for their intended purposes on ranges or collected for further evaluation and recycling are not considered waste per the Military Munitions Rule (40 CFR § 266.202). The Military Munitions Rule amended portions of the Resource Conservation and Recovery Act (40 CFR §§ 260 through 170) and defines when conventional and chemical military munitions become solid waste potentially subject to this Act. Because any munitions associated with the proposed action and alternatives would be used for its intended training purpose and most flare residual material or debris does not constitute a hazardous waste, any residual material that falls to the ground would not be considered a solid waste and thus not a hazardous waste.

1.2.4 Contaminated Sites

In 1986, Congress created the Defense Environmental Restoration Program. The Defense Environmental Restoration Program addresses the identification and cleanup of hazardous waste and military

munitions remaining from past activities at Department of Defense installations and formerly used defense sites. Within the Defense Environmental Restoration Program, the Department of Defense has several program categories: the Installation Restoration Program, Formerly Used Defense Sites, the Military Munitions Response Program, and Base Realignment and Closure.

1.2.4.1 Installation Restoration Program

The Installation Restoration Program focuses on cleaning up releases of hazardous waste that pose risks to the public and/or the environment at properties actively owned or used by the U.S. military, including the Navy, Marine Corps, and the Air Force.

1.2.4.2 Formerly Used Defense Sites

This program manages environmental cleanup on eligible properties formerly owned, leased, possessed, or used by the Department of Defense. The program only applies to properties that transferred from the Department of Defense before 1986 (Department of Defense 2014a).

1.2.4.3 Military Munitions Response Program

The Military Munitions Response Program addresses munitions response sites at active installations, Formerly Used Defense Sites, and Base Realignment and Closure locations with suspected or known hazards from munitions and explosives of concern that occurred prior to September 2002, but are not already included within an Installation Restoration Program site cleanup activity. Munitions response sites are sites that are known or suspected to contain unexploded ordnance, discarded military munitions, or munitions constituents.

1.2.4.4 Base Realignment and Closure

Base Realignment and Closure is the process that the Department of Defense uses to reorganize its installations to better match facilities to changing military requirements. The process includes some level of environmental cleanup for 208 installations (Department of Defense 2014b).

1.2.4.5 Commonwealth of the Northern Mariana Islands State Response Program

Under the Brownfields Program, or State Response Program, the CNMI Bureau of Environmental and Coastal Quality set up several projects intended to meet the Program's requirements to establish and/or enhance the State Response Program for contaminated sites in the CNMI (CNMI Division of Environmental and Coastal Quality 2014). These include the development of environmental screening levels project, Brownfields site survey and inventory project, and Brownfields inventory database. If a Brownfields site is known or suspected to contain munitions and explosives of concern, development of that site may be prohibited or may proceed only with extreme caution and with the proper safety measures in place.

The CNMI Bureau of Environmental and Coastal Quality uses environmental screening levels to assist in identifying and prioritizing heavily contaminated sites. The environmental screening levels have been established for chemicals commonly found in soil and groundwater where releases of hazardous substances have occurred.

1.3 REGULATORY FRAMEWORK

Hazardous substances are controlled in the United States primarily by laws and regulations administered by the U.S. Environmental Protection Agency, the U.S. Occupational Safety and Health Administration, and the U.S. Department of Transportation. Each agency incorporates hazardous substance safeguards according to its unique Congressional mandate. U.S. Environmental Protection Agency regulations focus on the protection of human health and the environment. Occupational Safety and Health Administration regulations primarily protect employee and workplace health and safety. Department of Transportation regulations promote the safe transportation of hazardous substances used in commerce.

Department of Defense installations are required to comply with all applicable federal, territorial (e.g., the CNMI Bureau of Environmental and Coastal Quality), and Department of Defense laws and regulations and Executive Orders.

1.3.1 Federal Regulations

Below are listed some, but not all, of the hazardous substance federal laws and regulations that Tinian Department of Defense installations and operations must comply with.

1.3.1.1 Comprehensive Environmental Response, Compensation, and Liability Act

Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act, a hazardous substance is defined as one that poses a potential hazard to human health or the environment by virtue of its quantity, concentration, or physical/chemical characteristics. The Comprehensive Environmental Response, Compensation, and Liability Act has established a national process to identify, characterize, and clean up hazardous waste sites.

1.3.1.2 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments define hazardous waste as:

- A solid waste not specifically excluded from being classified as a hazardous waste under 40 CFR 261.4(b) that exhibits any of the characteristics (i.e., ignitability, corrosivity, reactivity, or toxicity) described in 40 CFR 261, or
- Is listed in 40 CFR 261 Subpart D, or
- Is a mixture containing one or more listed hazardous wastes from 40 CFR 261 Subpart D.

Hazardous waste may take the form of a solid, liquid, contained gas, or semi-solid. In general, any combination of waste that poses a substantial present or potential hazard to human health or the environment that has been discarded or abandoned is a hazardous waste.

The Resource Conservation and Recovery Act requires that all hazardous waste be systematically tracked from cradle-to-grave. This hazardous waste tracking system mandates the collection and retention of key information including the generator of the waste, how the waste is routed to the

receiving facility, a description of the waste, the quantity of the waste, identification of the facility that receives the waste, and other relevant data.

The Resource Conservation and Recovery Act grants the U.S. Environmental Protection Agency, authorized states, and U.S. territories the authority to regulate hazardous waste management facilities that treat, store, or dispose of hazardous waste. Furthermore, the Resource Conservation and Recovery Act Corrective Action Program compels responsible parties of active facilities to investigate and clean up hazardous waste releases.

1.3.1.3 Military Munitions Rule under the Resource Conservation and Recovery Act

The Military Munitions Rule was published as a final rule in 1997 and identifies when conventional and chemical military munitions become Resource Conservation and Recovery Act hazardous waste. Military munitions include, but are not limited to: confined gases, liquids, or solid propellants; explosives; pyrotechnics; chemical and riot agents; and smoke canisters (U.S. Environmental Protection Agency 2008). Under the Military Munitions Rule, wholly inert items and non-munitions training materials are not defined as military munitions (U.S. Environmental Protection Agency 1997).

The Department of Defense has historically conducted live-firing, ordnance testing, and training exercises to ensure military readiness. Decades of these munitions-related activities have resulted in the presence of unexploded ordnance, discarded military munitions, and munitions constituents. Unexploded ordnance, discarded military munitions, and munitions constituents all present potential explosive hazards and are collectively referred to as munitions and explosives of concern. In 1997, the Final Military Munitions Rule (40 CFR 266, Subpart M) was published defining munitions and explosives of concern handling requirements.

Military munitions that are used for their “intended purposes” are not considered waste per the Military Munitions Rule (40 CFR 266.202). In general, military munitions become subject to Resource Conservation and Recovery Act transportation, storage, and disposal requirements (i.e., judged not to have been used for their “intended purposes”) when:

- Munitions are transported off-range for storage.
- Munitions are reclaimed and/or treated for disposal.
- Munitions are buried or land filled on- or off-range.
- Munitions land off-range and are not immediately rendered safe or retrieved.

Munitions and explosives of concern are found on active, inactive, and closed military training ranges. Active ranges include areas being used on a periodic, ongoing basis for training purposes. Inactive ranges are: (1) not currently being used, (2) still under military control and, therefore, may be used in the future as a military range, and (3) have not been put to a new use that is “incompatible” with range activities. Closed ranges are areas that have been taken out of service and put to a new use “incompatible” with range activities.

According to U.S. Environmental Protection Agency interpretation, the Military Munitions Rule “...applies only to the recovery, collection, and on-range destruction of unexploded ordnance and munitions fragments during range clearance activities at *active or inactive ranges*.” With regard to

closed ranges, the U.S. Environmental Protection Agency did not generally intend to include these range clearance activities to be within the scope “...of the intended use ...exception to Subtitle C of the Resource Conservation and Recovery Act granted by the Military Munitions Rule...munitions and explosives of concern” located on closed ranges therefore “...would at some point become a solid waste potentially subject to the Resource Conservation and Recovery Act and also may include hazardous substances, pollutants or contaminants subject to the Comprehensive Environmental Response, Compensation, and Liability Act...” In summary, munitions and explosives of concern at *closed* ranges are classified as solid waste and would likely be subject to Resource Conservation and Recovery Act Subtitle C hazardous waste handling and disposal requirements and therefore subject to regulatory oversight (Personal communication, U.S. Environmental Protection Agency, 2005).

1.3.1.4 Emergency Planning and Community Right-to-Know Act

The Emergency Planning and Community Right-to-Know Act of 1986 requires businesses and governments to report the use of hazardous and toxic chemicals. The Emergency Planning and Community Right-to-Know Act also requires that workers be trained as to safe chemical handling protocols and specific chemical hazards and controls for substances used in the workplace. In addition, the Emergency Planning and Community Right-to-Know Act requires that state and local communities be prepared to respond to potential chemical accidents through the development of emergency response plans and other measures.

1.3.1.5 Toxic Substances Control Act

The Toxic Substance Control Act of 1976 addresses concerns regarding chemical substances and mixtures whose manufacturing and use may pose an unreasonable risk of injury, adverse health, or adverse environmental consequences. The Toxic Substance Control Act is designed to regulate these substances and mixtures used in interstate commerce.

The Toxic Substance Control Act requires that prior to the manufacturing of a new substance(s), a pre-manufacture notice be filed with the U.S. Environmental Protection Agency. This notice provides information describing the toxicity of the substance(s). Toxic chemical substances regulated under the Toxic Substance Control Act include asbestos, lead, polychlorinated biphenyls, and radon as well as numerous other substances. The Toxic Substance Control Act chemical substances inventory contains information on over 62,000 compounds.

1.3.1.6 Oil Pollution Act

The Oil Pollution Act of 1990 requires oil storage facilities and vessels to develop plans describing how spills or releases would be addressed. Specifically, the Oil Pollution Act requires that facilities prepare and implement spill prevention, control, and countermeasures plans and facility response plans. These plans specify how these facilities would assess and respond to spills/releases. The Department of Defense is subject to Oil Pollution Act requirements to report spills and releases to applicable regulators. The Oil Pollution Act also obligates the Department of Defense to properly contain, control, and remediate all spills/releases.

1.3.1.7 Pollution Prevention Act

The Pollution Prevention Act focuses on pollution source(s) reduction and promotes the implementation of new and innovative practices to conserve and protect natural resources. These measures may include, but are not limited to, reducing pollution through process modifications and the use of different, less toxic materials and substances.

1.3.1.8 Occupational Safety and Health Administration Regulations

Occupational Safety and Health Administration requirements are designed to protect workers and prevent workplace accidents, injuries, or illnesses. One such requirement is the Hazard Communication Regulation (29 CFR 1910.1200), which defines a hazardous chemical as one that poses a physical or health hazard and requires that workers are trained and notified of specific hazards associated with hazardous workplace substances. The definition includes:

- Carcinogens, toxins, toxic agents, irritants, corrosives, and sensitizers
- Agents that act on the hematopoietic system
- Agents that damage the lungs, skin, eyes, or mucous membranes
- Chemicals that are combustible, explosive, flammable, unstable (reactive), or water-reactive
- Oxidizers
- Pyrophorics
- Chemicals that, in the course of normal handling, use, or storage, may produce or release dusts, gases, fumes, vapors, mists, or smoke that may have any of the previously mentioned characteristics

Currently, the Occupational Safety and Health Administration regulates workplace exposure to approximately 400 substances, including dusts, mixtures, and common materials such as paints, fuels, and solvents.

1.3.2 Commonwealth of the Northern Mariana Islands Regulations

The CNMI administers its environmental laws and regulations through the CNMI Bureau of Environmental and Coastal Quality. CNMI environmental laws and regulations are discussed below.

1.3.2.1 Commonwealth Environmental Protection Act

The Commonwealth Environmental Protection Act established the CNMI Department of Environmental Quality as an independent agency. Under the original enabling legislation, the CNMI Department of Environmental Quality promulgated regulations addressing many aspects of environmental resources management and emphasizing the direct and indirect protection of the CNMI's most valuable resources, its public water supply.

1.3.2.2 Harmful Substances Clean Up Regulations

The CNMI Harmful Substance Clean Up Regulations were adopted under the authority of the CNMI Environmental Protection Act (Public Law 3-23; 2 CMC § 3101 et seq. [as amended by Public Law 11-103]; 1 CMC § 2646-2649; Public Law 11-108). These regulations establish administrative processes and

standards to identify, investigate, and clean up facilities and sites where hazardous substances have come to be located.

1.3.2.3 Hazardous Waste Management Regulations

CNMI Hazardous Waste Management Regulations are intended to address potential sources of pollution that may result from hazardous waste. To ensure proper management of hazardous waste from cradle-to-grave, handlers of hazardous waste are required to meet acceptable standards and practices applicable to their waste type and quantity. The regulations apply to all persons that handle, generate, transport, treat, store, or dispose any quantity of hazardous waste, as well as to all persons that import a hazardous substance or material containing a hazardous substance to the CNMI. No disposal of any quantity of hazardous waste on the ground surface, into the ocean, into drains, sinks, or septic systems is allowed. No treatment or disposal by burning or incineration is allowed unless authorized in writing by U.S. Environmental Protection Agency, Region 9.

1.3.2.4 Used Oil Management Rules and Regulations

The Used Oil Management Rules and Regulations are intended to ensure safe and proper management practice in the handling of the used oil from the initial point of generation to the final disposal action and to ensure the protection of the public health and welfare and the prevention of environmental contamination in the CNMI.

1.4 HISTORICAL USE OF HAZARDOUS SUBSTANCES

The historical use of munitions and other hazardous substances on Tinian and Pagan is included to provide more detailed information about previous land uses in the absence of more specific data in regard to contaminated sites on the islands. This type of information provides a historical context from which to evaluate the use of hazardous materials over time on the island.

1.4.1 Tinian

The following is summarized from *Final Report, Environmental Baseline Survey Island of Tinian Commonwealth of the Northern Mariana Islands* (referred to as the 1997 Environmental Baseline Survey) (GMP Associates, Inc. 1997) and information contained in Section 3.11, *Cultural Resources*, of this EIS/OEIS.

Land uses on Tinian have varied historically from being largely uninhabited until the early 1920s, to predominant agricultural use in the cane sugar industry throughout the late 1920s and 1930s, and then to predominant military use by the Japanese and U.S. during World War II. Following World War II, small-scale U.S. military activity continued through the present time. Meanwhile, civilian agriculture, cattle ranching, and eventually tourist activities began to take place on the island.

Tinian was largely depopulated after European contact in the 1600s until the Japanese South Seas Development Company leased the entire island in 1926 for sugar cane cultivation and bulldozed most of the native forests and vegetation. By 1936, almost 50 miles (80 kilometers) of railroad tracks connected the island's sugar cane industry. The South Seas Development Company also developed Tinian Town (San Jose). The Japanese began building an airfield at the northern tip of Tinian near Lake Hagoi in 1939.

The airfield was known as Ushi Point Airfield and was later incorporated into North Field. The Japanese also constructed a second airfield in the west-central portion of the island; this later became the site for West Field under the U.S. military. In 1940, the Japanese military government took control of Tinian and defensive and offensive structures were built.

U.S. troops landed on Tinian on July 24, 1944. Ushi Point Airfield was captured, and by August 1944 the entire island was secured. Tinian Town (San Jose) and most of the island's rural infrastructure was destroyed in the fighting. The U.S. forces rapidly constructed North Field, consisting of four 8,500-foot (2,600-meter) runways for B-29 bombers. Tinian was the largest U.S. base in the Pacific during World War II. Service and maintenance facilities, camps, quarries, roads, and utilities were built to support the airfields. The U.S. military also built two aviation fuel storage tank farms, fuel distribution lines, an asphalt plant, a bomb storage facility ("Central Bomb Dump"), and a bomb assembly building in the area south of North Field. In the area surrounding West Field (Tinian International Airport), there were residence camps for construction and bomb personnel, service and maintenance facilities, a bomb storage facility ("Masalog Bomb Dump"), an asphalt plant, and two aviation fuel farms. There was also an island-wide system of fuel distribution pipes connecting fuel tank farms at the various locations around the island to North Field.

Tinian was abandoned as a military base within a year of the end of World War II. In 1949, the Air Force carried out ordnance disposal along with commercial scrap metal salvage that removed most of the recyclable metal from the island. This included Quonset huts, vehicles, water and fuel tanks, and weapons. Some, but not all, empty fuel tanks, fuel distribution piping, and ordnance were also removed during this effort. By this time the majority of military personnel had left Tinian.

After World War II, the U.S. military used parts of Tinian for intermittent military exercises, namely the North Field runways. The Tinian Mortar Range (Chiget Mortar Range), which had been part of the World War II battlefields, was subsequently used from 1945 through 1994 for live-fire weapons training by the U.S. military. During the Korean War, the U.S. military again used some of the abandoned facilities on Tinian. It appears that North Field supported a base camp for the Navy Patrol Squadron VP-6, as well as a single-target bombing range. In 1965, the Micronesia Development Company signed a 30-year lease for a large portion of land on Tinian, to be used largely for cattle grazing. Another company called Bio Pacific leased some land in the western portion of the island for about 10 years starting in 1980. Bio Pacific used the land for experimental fruit tree production. In 1983, the U.S. signed a Lease Agreement with the CNMI to lease 17,798 acres (7,202 hectares) of land on Tinian, including the northern portion of the island (i.e., the Military Lease Area).

The village of San Jose was resettled in 1947 by Chamorro immigrants from Yap Island, who began farming and raising cattle and pigs. Since World War II, San Jose has grown to include government offices, small businesses, grocery stores, a post office, schools, a hospital, small hotels and restaurants, and various harbor activities. Farming and ranching continued in many areas through the 1980s, but vegetation slowly began to take over the fields as farming became less commonly practiced. In 1970, Mobil Oil Mariana Islands, Inc. established a bulk fuel plant at the harbor that supplies gasoline and diesel fuel to the island, including the Commonwealth Utility Corporation power plant. The Tinian Dynasty Hotel and Casino, a five-star hotel that is the only one of its kind in the Western Pacific, opened in 1998 (Saipan Tribune 2013).

North Field is currently used for military training exercises by the Navy, Air Force, Marine Corps, and the Guam Army National Guard. The Tinian Mortar Range (Chiget Mortar Range) is not currently used. Micronesia Development Company no longer leases any land within the northern portion of the island.

1.4.2 Pagan

Like Tinian, land uses on Pagan have varied historically from being largely uninhabited until the early 1920s, to predominant agricultural use throughout the 1920s and 1930s, and then to predominant military use by the Japanese and United States during World War II in the late 1930s and 1940s. Following World War II, small-scale U.S. military activity remained until the 1950s when small scale agricultural use resumed. The remaining residents were evacuated from Pagan in 1981 due to the large-scale eruption of Mount Pagan. Since 1981, the island has not been resettled or used for industrial or agricultural purposes.

The following background information is summarized from the *Final Historical Ordnance Assessment Study, Pagan, and CNMI* (DoN 2013) as it relates the historical use of hazardous materials on Pagan. After the League of Nations awarded Micronesia to Japan in 1921, the Japanese South Seas Development Company began producing copra (dried coconut meat) on Pagan in the 1920s. In the 1930s, a small dried bonito factory was also established near Laguna Sanhiyon near Apan Bay. Cotton, wild long taro, lemons, "Japanese banana," pineapple, breadfruit, and oranges were planted in cleared areas in the foothills of Mount Pagan. Agricultural activity on Pagan increased, and large quantities of sweet potatoes were exported. As the Japanese population increased through 1939, a commercial area developed on the inner landside of Shomson Beach serving workers housed on the outer shoreside. A Japanese Navy Construction Office was also located on the outer shoreside of Shomson Beach. Japan began building the Pagan airfield before 1937, and upgraded it to an airbase for Japanese forces during World War II. In 1944, there were over 2,150 men from the Japanese Imperial Army and 344 men from the Japanese Imperial Navy stationed at the airbase. Japanese military structures present on Pagan during 1944 included the airfield with a compacted earth runway, an aircraft hangar with space for 10 Zero fighter planes, two concrete air raid shelters, barracks, fuel storage, bomb storage, officers' quarters, and a water reservoir. There were also a radio tower, lookout tower, additional barracks east of Laguna Sanhiyon, a radio station and regiment headquarters adjacent to Laguna Sanhalom, and a pier on Shomson Bay (built in 1939). Japanese naval vessels anchored in Apan Bay as well.

To protect structures and fortify Pagan, the Japanese installed multiple defensive gun placements around the island. The crests of most ridges and peaks have networks of trenches, machine gun positions, and foxholes. Pillboxes, gun emplacements, command and Observation Posts, and underground excavations for storage and shelter lined the sides of hills. Trenches, tank traps, anti-aircraft, and artillery positions were located on the plains surrounding the airfield. A radio station and naval headquarters were maintained on the upland slopes south of Mount Pagan. The coastal defenses were concentrated along the beaches of Apan Bay and Pegusa Bay. A network of tunnels leads to gun positions in the cliffs west of Pegusa Bay. The U.S. began aerial missions against Japanese-controlled Pagan on June 12, 1944, and continued through September 1945. Most of the missions took place from June through September of 1944. U.S. bombing missions focused on destroying the airfield and associated bunkers, hangars, fuel storage areas, and barracks to cripple Japanese fighting power on

Pagan. The mission objectives were to destroy enemy aircraft coastal defense, anti-aircraft batteries, and render the airfield temporarily useless.

Japanese forces on Pagan surrendered to the Marine Corps in September 1945 and were returned to Japan. Surviving Chamorro residents on the island were taken to Saipan. Following the war, the Mariana Islands were administered by the U.S. Trust Territory, and a small military contingent remained on Pagan to maintain the airfield. In 1951, 57 Chamorros relocated to Pagan to resume copra production, which lasted through the 1970s. The remaining 53 residents were evacuated from Pagan in 1981 due to the large-scale eruption of Mount Pagan, which destroyed much of the vegetation on the northern part of the island and covered the eastern portion of the old airfield with about 20 to 30 feet (6 to 9 meters) of lava rock. Since 1981, the island has not been resettled or used for industrial or agricultural purposes.

1.5 DEPARTMENT OF DEFENSE PROGRAMS FOR DOCUMENTING HAZARDOUS MATERIALS ASSOCIATED WITH TRAINING ACTIVITIES

The U.S. military has established several programs for documenting and managing hazardous materials and hazardous wastes associated with training activities. Marine Corps facilities must follow the requirements of Marine Corps Order 5090.2A (Environmental Compliance and Protection Manual), which include policies and procedures for hazardous waste management, waste military munition minimization, range operations, and munitions disposition (DoN 2009). The purpose of these policies and procedures is to ensure that hazardous waste practices protect human health and the environment.

U.S. military facilities are required to record toxic chemical releases generated during training events as part of the Emergency Planning and Community Right-to-Know Act. This Act establishes requirements for federal, state, and local governments and industry regarding reporting of hazardous and toxic chemicals. Access to this information contributes to improving chemical safety and protecting public health and the environment. Hazardous material releases to the environment from ordnance used in training require annual reporting to the U.S. Environmental Protection Agency under the Emergency Planning and Community Right-to-Know Act Toxic Release Inventory program. Under this program, an installation must report on the Toxic Release Inventory Form R the quantity of ordnance-related chemicals that exceeds applicable reporting thresholds. The Form R must also include information related to how these chemicals were released to the environment, recovered, or recycled. The Form R for each calendar year must be submitted to the U.S. Environmental Protection Agency by July 1 of the following year.

The Marine Corps Range Environmental Vulnerability Assessment program is a proactive and comprehensive program designed to support the Marine Corps' Range Sustainment Program. The operational range assessments conducted through the Range Environmental Vulnerability Assessment program enhance the Marine Corps' ability to prevent or respond to a release or substantial threat of a release of munitions constituents from an operational range or range complex to off-range areas (Marine Corps 2008). Operational ranges across the Marine Corps are being assessed under the Range Environmental Vulnerability Assessment program to identify areas and activities that are subject to

possible impacts from external influences, as well as to determine whether a release or substantial threat of a release of munitions constituents from operational ranges to off-range areas creates an unacceptable risk to human health and/or the environment. This is accomplished through a baseline assessment of operational range areas and, where applicable, the use of fate and transport modeling/analysis of the indicator munitions constituents based upon site-specific environmental conditions at the operational ranges and training areas. The scope of the Range Environmental Vulnerability Assessment program includes Marine Corps operational ranges located within the United States and overseas (Marine Corps 2008).

Naval Ordnance Safety and Security Activity Instruction 8020.15B establishes the Explosives Safety Submission process to provide effective review, oversight, and verification of the explosives safety aspects of munitions responses. When the Explosives Safety Submission has been endorsed by Naval Ordnance Safety and Security Activity and approved by the Department of Defense Explosive Safety Board, standard operating procedures and operational protocol would be developed for addressing explosive safety hazards of munitions and explosives of concern in the construction areas.

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